GrantApp AI

JAMB Practice Test Results — 2026-02-21

10.0%

14 / 140 Correct

Mathematics

Time taken: 06:52

NEEDS WORK

QUESTION BREAKDOWN

#	QUESTION	YOURS	ANSWER
1	If 0.000456 is written in standard form as 4.56 × 10…	—	A ✗
	Explanation: Move decimal right for negative powers. $0.000456 = 4.56 \times 10^{-4}$ **Note:** The count starts AFTER the first non-zero digit.		
2	Simplify: $(\sqrt{2} + \sqrt{3})(\sqrt{2} - \sqrt{3})$	—	A ✗
	Explanation: Difference of squares: $(a+b)(a-b) = a^2 - b^2$. Result = 2 − 3 = −1. **Note:** Students expect positive result when both surds are positive.		
3	If $\log_{10} 2 = 0.3010$, find $\log_{10} 0.02$	—	D ✗
	Explanation: $\log(0.02) = \log(2 \times 10^{-2}) = 0.3010 - 2 = -1.699$. **Note:** Logarithms of numbers < 1 are NEGATIVE, not undefined.		
4	What is the remainder when $2x^3 + 3x^2 - 5x + 7$ is div…	—	B ✗
	Explanation: Remainder theorem: $f(-2) = -16 + 12 + 10 + 7 = 21$. **Note:** Use x = −2, not +2, because divisor is (x + 2).		
5	Solve: $\|2x - 3\| = 5$	—	D ✗
	Explanation: $\|a\| = b$ gives $a = \pm b$. So $2x - 3 = 5$ OR $2x - 3 = -5$, giving x = 4 or x = −1. **Note:** TWO solutions exist, not one.		
6	If $\sin\theta = 3/5$ and θ is acute, find $\cos\theta$	—	C ✗
	Explanation: $\cos\theta = \sqrt{(1 - \sin^2\theta)} = \sqrt{(1 - 9/25)} = \sqrt{(16/25)} = 4/5$. **Note:** cos θ is positive ONLY because θ is acute.		
7	Find the nth term of: 3, 7, 11, 15 ...	—	D ✗
	Explanation: AP: $T_n = a + (n-1)d = 3 + 4(n-1) = 4n - 1$. **Note:** Verify: when n = 1, 4(1) − 1 = 3 ✓		

8	Evaluate: $\sqrt[3]{(-27)}$	—	A ✗
	Explanation: Cube roots of negative numbers ARE defined. $\sqrt[3]{(-27)} = -3$. **Note:** Odd roots preserve sign; only even roots require non-negative radicands.		
9	If $3^x = 27^{x-2}$, find x	—	B ✗
	Explanation: $3^x = (3^3)^{x-2} = 3^{3x-6}$. Equate: $x = 3x - 6$, so $x = 3$. **Note:** This only works because bases are equal.		
10	A binary operation * is defined by $a * b = a^2 - b^2$. …	—	D ✗
	Explanation: $3 * 2 = 3^2 - 2^2 = 9 - 4 = 5$. **Note:** * here does not mean multiplication.		
11	Find the inverse of $f(x) = (2x + 1)/(x - 3)$	—	C ✗
	Explanation: Swap x and y, solve for y: $f^{-1}(x) = (3x + 1)/(x - 2)$. **Note:** Domain excludes $x = 2$ (division by zero).		
12	How many diagonals does a regular hexagon have?	—	D ✗
	Explanation: Formula: $n(n-3)/2$. For $n=6$: $6(3)/2 = 9$. **Note:** Total line segments = $n(n-1)/2 = 15$; diagonals exclude the 6 sides.		
13	If $P = \{1,2,3\}$ and $Q = \{2,3,4\}$, find $n(P \cup Q)$	—	D ✗
	Explanation: $P \cup Q = \{1,2,3,4\}$, $n = 4$. Using formula: $3 + 3 - 2 = 4$. **Note:** Don't count repeated elements.		
14	Differentiate $y = x^3 - 3x^2 + 2$ with respect to x	—	A ✗
	Explanation: Power rule: $dy/dx = 3x^2 - 6x$. **Note:** Constant term (2) disappears; derivative of constant = 0.		
15	Convert 234_5 to base 10	—	A ✗
	Explanation: $2(25) + 3(5) + 4(1) = 50 + 15 + 4 = 69$. **Note:** In base 5, digits must be 0–4; a digit ≥5 is invalid.		
16	Find the median of: 2, 8, 6, 4, 10	—	D ✗
	Explanation: Order: 2, 4, 6, 8, 10. Middle value = 6. **Note:** For even count, median = average of two middle values.		
17	Simplify: $(x^2 - 9)/(x^2 + 6x + 9)$	—	A ✗
	Explanation: Factor: $(x-3)(x+3)/(x+3)^2 = (x-3)/(x+3)$. **Note:** $x \neq -3$ (domain restriction).		
18	A rectangle has length (x + 3) and width (x – 2). Fi…	—	C ✗

Explanation: Area = (x+3)(x–2) = $x^2 - 2x + 3x - 6 = x^2 + x - 6$.
Note: Expand fully; middle terms do not cancel.

19	In a class of 40, 24 like Math, 16 like English, 8 l…	—	A ✗

Explanation: n(M∪E) = 24 + 16 – 8 = 32. Neither = 40 – 32 = 8.
Note: Include/Exclusion principle is essential here.

20	Find the sum of the first 10 terms of: 2 + 4 + 6 + 8…	—	A ✗

Explanation: $S_n = n/2(2a + (n-1)d) = 5(4+18) = 110$.

21	If the mean of 4, 7, x, 10, 9 is 8, find x	—	B ✗

Explanation: Sum = 5 × 8 = 40. 4+7+x+10+9 = 30+x = 40, so x = 10.

22	Factorize: $6x^2 + 7x - 3$	—	D ✗

Explanation: Product = –18, sum = 7. $6x^2 + 9x - 2x - 3 = (3x-1)(2x+3)$.

23	Evaluate: $\int(3x^2 + 2x)dx$	—	C ✗

Explanation: $\int x^n\,dx = x^{n+1}/(n+1)$. $\int 3x^2 = x^3$; $\int 2x = x^2$. Total: $x^3 + x^2 + C$.
Note: Always add constant C for indefinite integrals.

24	A circle has equation $x^2 + y^2 = 25$. What is the radius?	—	A ✗

Explanation: Standard form $x^2 + y^2 = r^2$. $r^2 = 25$, so r = 5.
Note: $r = \sqrt{25} = 5$, not 25.

25	If $4x - 3 \leq 13$, find the range of x	—	A ✗

Explanation: $4x \leq 16$, $x \leq 4$.
Note: Inequality sign only flips when dividing/multiplying by a negative number.

26	Find the equation of a line with gradient 2 passing …	—	B ✗

Explanation: $y - y_1 = m(x - x_1)$: $y - 3 = 2(x - 1)$, $y = 2x + 1$.
Note: Substitute the given point, not the origin.

27	How many ways can 5 students be arranged in a row?	—	D ✗

Explanation: 5! = 5 × 4 × 3 × 2 × 1 = 120.
Note: Permutation (order matters) ≠ combination (order irrelevant).

28	A bag contains 3 red and 2 blue balls. A ball is dra…	—	C ✗

Explanation: P(red) = 3/(3+2) = 3/5.
Note: Probability must be between 0 and 1; 3/2 is impossible.

29	The angles of a triangle are in ratio 1:2:3. Find th…	–	A ✗

Explanation: Sum = 180°. Parts: 1+2+3 = 6. Largest = (3/6) × 180 = 90°.
Note: Sum of triangle angles is always 180°, not 360°.

30	Calculate the volume of a cylinder with radius 7cm a…	–	A ✗

Explanation: V = $\pi r^2 h$ = (22/7) × 49 × 10 = 22 × 70 = 1540 cm^3.
Note: Use r^2, not r; a common error is computing πrh instead.

31	If y varies directly as x and y = 12 when x = 4, fin…	–	B ✗

Explanation: y = kx. k = 12/4 = 3. y = 3 × 7 = 21.

32	Express $0.\bar{1}$ (0.111...) as a fraction	–	D ✗

Explanation: Let x = 0.111... Then 10x = 1.111... Subtract: 9x = 1, x = 1/9.
Note: $0.\bar{1} \neq 1/10$. Only 0.1 (terminating) equals 1/10.

33	Find the value of x in the equation 2^(x+1) = 32	–	A ✗

Explanation: 32 = 2^5. So x+1 = 5, x = 4.
Note: Express both sides as powers of the same base first.

34	The gradient of a line perpendicular to y = 3x + 5 is	–	C ✗

Explanation: Perpendicular gradient = −1/m = −1/3.
Note: Product of perpendicular gradients = −1. Not the negative, but the negative reciprocal.

35	Simplify: 2log 5 + log 4 − log 2	–	C ✗

Explanation: 2log5 = log25. log25 + log4 − log2 = log(25 × 4 / 2) = log(50).
Note: log addition = multiplication; log subtraction = division of arguments.

36	Choose the word that is OPPOSITE in meaning to "ubiq…	A	A ✓
37	Choose the option with the same vowel sound as the u…	D	D ✓
38	In the sentence "The committee has submitted its rep…	B	A ✗

Explanation: Collective nouns take singular verbs when acting as a unit.
Note: British English often uses plural verbs for collectives.

39	Identify the literary device: "The classroom was a zoo"	–	A ✗

Explanation: Direct comparison without like/as = metaphor.

40	Which sentence uses "lie" correctly?	B	C ✗

Explanation: Lie (recline) is intransitive: lie/lay/lain. Lay (put down) is transitive: lay/laid/laid.

41	Choose the correctly punctuated sentence:	B	D ✗
	Explanation: Comma before quote, capital letter starts quote, period inside closing quote.		
42	Identify the error: "Neither the students nor the te…	D	C ✗
	Explanation: With neither...nor, verb agrees with NEAREST subject. Teacher (singular) requires was.		
43	The prefix "bi-" in "biannual" means:	C	B ✗
	Explanation: Biannual = twice yearly. **Note:** Biennial = every two years. These are commonly confused.		
44	Choose the word with correct spelling:	D	B ✗
	Explanation: Double the final consonant before -ed when: stressed final syllable ends in CVC.		
45	In "The faster you run, the sooner you'll arrive," t…	C	D ✗
	Explanation: The + comparative...the + comparative shows correlation.		
46	Identify the sentence with correct pronoun usage:	A	D ✗
	Explanation: After prepositions, use objective case (me/him/her).		
47	The word "sanction" can mean:	A	A ✓
48	Which uses the subjunctive mood correctly?	B	B ✓
49	Identify the dangling modifier:	B	D ✗
	Explanation: Walking home illogically modifies rain (rain can't walk).		
50	The word "egregious" originally meant "remarkably go…	—	D ✗
	Explanation: Pejoration = word becomes more negative over time.		
51	In "She is taller than I," the implied ending is:	D	A ✗
	Explanation: After than in formal writing, use subject case when verb is implied.		
52	Choose the sentence with correct parallel structure:	A	A ✓
53	The phrase "I could care less" is:	A	C ✗
	Explanation: Logically, couldn't care less means zero care possible.		
54	Identify the oxymoron:	—	D ✗
	Explanation: Oxymoron combines contradictory terms. Silence can't be loud.		

55	In passive voice, the sentence "The cat chased the m…	A	A ✓
56	The word "literally" is increasingly used to mean:	A	A ✓
57	Choose the sentence with correct comma usage:	B	B ✓
58	The error in "Irregardless of the cost, we'll procee…	C	D ✗
	Explanation: Irregardless is double negative (ir- + -less). Standard form: regardless.		
59	In "The data is conclusive," the subject-verb agreem…	—	C ✗
	Explanation: Data is Latin plural of datum. Modern usage treats it as singular mass noun.		
60	Identify the malapropism: "Texas has a large Portugu…	A	C ✗
	Explanation: Malapropism substitutes similar-sounding wrong word.		
61	The sentence "Whom did you see?" is:	C	C ✓
62	Choose the correct verb form: "If I _____ known, I w…	C	C ✓
63	The phrase "beg the question" traditionally means:	D	D ✓
64	In "She is one of those teachers who inspire student…	A	B ✗
	Explanation: Who refers to teachers (plural antecedent), so inspire (plural verb).		
65	Identify the split infinitive:	A	D ✗
	Explanation: Adverb between to and verb = split infinitive.		
66	The word "presently" means:	C	B ✗
	Explanation: Presently means soon (traditional) OR now (American usage).		
67	Choose the correct form: "Neither of the answers ___…	D	B ✗
	Explanation: Neither is singular pronoun, takes singular verb.		
68	In "The house was engulfed in flames," the phrase "i…	—	D ✗
	Explanation: In flames describes how/in what state house was engulfed (modifies verb).		
69	The sentence "We was ready to leave" contains:	A	C ✗
	Explanation: We was appears in some English dialects.		
70	Identify the zeugma: "She broke his car and his heart"	—	A ✗
	Explanation: Zeugma uses one word in two senses simultaneously.		

71	An element X has atomic number 17 and mass number 35…	—	B ✗

Explanation: Neutrons = mass number - atomic number = 35 - 17 = 18.
Note: Isotopes of same element have different neutron counts but same atomic number.

72	Which electronic configuration violates Hund's rule?	—	B ✗

Explanation: Hund's rule: electrons singly occupy orbitals before pairing. Option C pairs prematurely.
Note: Maximum multiplicity (unpaired electrons) gives lowest energy.

73	The ion with electronic configuration 1s2 2s2 2p6 co…	—	A ✗

Explanation: Both have 10 electrons (isoelectronic with Ne). Na loses 1e-, F gains 1e-.
Note: Isoelectronic species have same electron count but different nuclear charges.

74	Electronegativity increases across a period because:	—	C ✗

Explanation: More protons pull electrons stronger; smaller size means closer to nucleus.
Note: Noble gases often excluded from electronegativity trends.

75	Which statement about first ionization energies is c…	—	C ✗

Explanation: IE generally increases across period. Mg > Na.
Note: Actual exceptions: Al < Mg (subshell), O < N (pairing energy).

76	Noble gases are unreactive because:	—	D ✗

Explanation: ns2np6 configuration is stable.
Note: Xe and Kr CAN form compounds with highly electronegative F.

77	The bond angle in water (104.5°) is less than methan…	—	A ✗

Explanation: VSEPR: lone pair-lone pair > lone pair-bond > bond-bond repulsion.
Note: NH3 (107°) also compressed from tetrahedral but less than H2O.

78	Which molecule is nonpolar despite having polar bonds?	—	A ✗

Explanation: CO2: two C=O bonds cancel (linear geometry).
Note: CCl4 also nonpolar (tetrahedral symmetry) despite polar C-Cl bonds.

79	The hybridization of carbon in CO2 is:	—	D ✗

Explanation: Linear geometry = sp hybridization (2 regions of electron density).
Note: Same carbon can have different hybridizations: CH4 (sp3), C2H4 (sp2), C2H2 (sp).

80	Resonance structures of benzene show:	—	C ✗

Explanation: Resonance = single structure with delocalized electrons, NOT equilibrium between forms.

81	Hydrogen bonding is strongest between:	—	B ✗
	Explanation: Strength: F-H > O-H > N-H (electronegativity trend). **Note:** O-H bonds in water are more biologically important despite F-H being stronger.		
82	The pH of 0.01 M HCl is:	—	A ✗
	Explanation: pH = -log[H+] = -log(10-2) = 2. **Note:** Very concentrated acids (>1M) can have negative pH.		
83	A buffer solution resists pH change because:	—	C ✗
	Explanation: Buffer: HA/A- pair. Absorbs added H+ or OH-. **Note:** Buffers only effective within ±1 pH unit of pKa.		
84	The pH at equivalence point in strong acid-strong ba…	—	D ✗
	Explanation: Neutral salt formed (NaCl from HCl + NaOH). **Note:** Weak acid-strong base gives pH >7; strong acid-weak base gives pH <7 at equivalence.		
85	At higher temperature, Kw (= [H+][OH-] = 10-14 at 25…	—	C ✗
	Explanation: Water ionization is endothermic; Le Chatelier predicts increase with temperature. **Note:** Neutral pH at 60°C is ~6.5 (not 7) because Kw increases.		
86	The oxidation number of Cr in K2Cr2O7 is:	—	B ✗
	Explanation: 2(+1) + 2x + 7(-2) = 0, so x = +6. **Note:** Maximum oxidation state usually equals group number; Cr in Group 6 can reach +6.		
87	In the reaction 2Fe2+ → 2Fe3+ + 2e-, iron is:	—	A ✗
	Explanation: Oxidation = loss of electrons (OIL RIG). Fe2+ is reducing agent.		
88	The standard hydrogen electrode is assigned:	—	B ✗
	Explanation: SHE is reference; all other potentials measured relative to it.		
89	In galvanic cell, the anode is:	—	B ✗
	Explanation: Anode = oxidation = negative in galvanic cell. **Note:** In electrolytic cell, anode is POSITIVE (but still oxidation site).		
90	Faraday's law: mass deposited is proportional to:	—	A ✗
	Explanation: m is proportional to Q. Specifically: m = (Q × M)/(n × F). **Note:** Time matters through Q = It; doubling current OR doubling time doubles mass.		
91	Haber process produces ammonia at:	—	C ✗

Explanation: N2 + 3H2 = 2NH3 (exothermic). Le Chatelier: high P favors products.
Note: Equilibrium position vs rate conflict requires optimization at ~450°C.

92	In N2 + 3H2 = 2NH3, adding more N2:	—	A ✗

Explanation: Le Chatelier: system counteracts change by consuming added N2.
Note: Kp unchanged; only position shifts, not equilibrium constant.

93	The equilibrium constant Kc for 2A = B is 4. For B =…	—	B ✗

Explanation: Reversing reaction inverts K: K_reverse = 1/K_forward.
Note: Multiplying equation by n raises K to power n.

94	A reaction is spontaneous if:	—	A ✗

Explanation: Gibbs: $\Delta G = \Delta H - T\Delta S$. Spontaneous when $\Delta G < 0$.
Note: Endothermic reactions CAN be spontaneous if ΔS is large and positive.

95	Diamond is harder than graphite because:	—	D ✗

Explanation: Diamond: sp3, tetrahedral. Graphite: sp2, layered with weak van der Waals between layers.
Note: Graphite conducts electricity (delocalized electrons in layers); diamond doesn't.

96	The melting point of NaCl (ionic) is higher than I2 …	—	C ✗

Explanation: Ionic > covalent network > metallic > polar molecular > nonpolar molecular (general trend).

97	Transition metals show variable oxidation states bec…	—	D ✗

Explanation: d electrons have similar energy to s electrons; can lose different numbers.
Note: Scandium and zinc show mainly +3 and +2 respectively.

98	Which is a Lewis acid?	—	D ✗

Explanation: Lewis acid = electron pair acceptor. BF3 has empty orbital.
Note: Broader than Bronsted (proton transfer); includes species without H+.

99	The pH of 10-8 M HCl is approximately:	—	C ✗

Explanation: At very low acid concentration, water's H+ (10-7 M) becomes significant.
Note: Can't ignore water ionization when acid concentration < 10-6 M.

100	Effusion rate of gas A is twice that of gas B. If M_…	—	D ✗

Explanation: Graham's law: rate is proportional to 1/sqrt(M). 2 = sqrt(M_B/4), so M_B = 16.

101	Real gases deviate from ideal behavior at:	—	C ✗

Explanation: High P: volume of molecules matters. Low T: intermolecular forces matter.

102	The van der Waals equation corrects ideal gas law for:	—	B ✗

Explanation: (P + a/V2)(V - b) = RT. a corrects pressure, b corrects volume.

103	Charcoal adsorbs gases because:	—	C ✗

Explanation: Adsorption (surface) vs absorption (volume). Activated charcoal has huge surface area.

104	A catalyst increases reaction rate by:	—	C ✗

Explanation: Catalyst provides alternative pathway with lower Ea.
Note: Catalyst doesn't change ΔH, ΔG, or equilibrium position.

105	Rate = k[A]2[B]. If [A] doubles and [B] triples, rate:	—	D ✗

Explanation: Rate_new = k(2[A])2(3[B]) = 4 × 3 × k[A]2[B] = 12 × Rate_old.

106	A car accelerates uniformly from rest to 30 m/s in 1…	—	B ✗

Explanation: $v = u + at \rightarrow a = 3\ m/s^2$. $s = ut + \frac{1}{2}at^2 = 0 + \frac{1}{2}(3)(100) = 150$ m. Equivalently, $s = (u + v)/2 \times t = 15 \times 10 = 150$ m.
Note: Students write $s = vt = 30 \times 10 = 300$ m, forgetting velocity built from 0, not a constant 30 m/s.

107	A ball is thrown vertically upward at 20 m/s. How hi…	—	C ✗

Explanation: At maximum height, $v = 0$. Using $v^2 = u^2 - 2gs$: $0 = 400 - 20s$, so $s = 20$ m.
Note: Crossover trap with Maths — same quadratic structure. The most common mistake is using +g instead of –g, giving $s = -20$ m.

108	A projectile is launched at 45° with initial speed 2…	—	A ✗

Explanation: $R = u^2\sin(2\theta)/g = (400 \times \sin 90°)/10 = 40$ m. $\sin 90° = 1$, so 45° gives maximum range.
Note: Students confuse $\sin(2\theta)$ with $2\sin(\theta)$. $\sin(2 \times 45°) = \sin(90°) = 1$; $2\sin(45°) = \sqrt{2} \neq 1$.

109	A force of 50 N acts on a 10 kg mass. What accelerat…	—	C ✗

Explanation: Newton's second law: $F = ma \rightarrow a = F/m = 50/10 = 5\ m/s^2$.
Note: Units check: N ÷ kg = kg·m/s² ÷ kg = m/s². Always verify units in Newton's law questions.

110	A 5 kg object moves at 4 m/s. What is its kinetic en…	—	D ✗

Explanation: $KE = \frac{1}{2}mv^2 = \frac{1}{2} \times 5 \times 4^2 = \frac{1}{2} \times 5 \times 16 = 40$ J.
Note: Forgetting to square v gives $\frac{1}{2} \times 5 \times 4 = 10$ J. The v^2 is the most skipped step in this formula.

111	A 2 kg mass is raised 5 m vertically. What work was …	—	B ✗

Explanation: W = mgh = 2 × 10 × 5 = 100 J. This equals the gravitational potential energy gained.
Note: Work done against gravity depends only on vertical height, NOT the path taken. A ramp or direct lift gives the same answer.

112	Which expression for power is correct?	—	A ✗

Explanation: P = W/t = (F × s)/t = F × v. When a force moves an object at velocity v, power = Fv.
Note: P = W × t is wrong — it inverts the relationship. Power = work PER unit time, not work TIMES time.

113	A machine has 75% efficiency. If useful output is 30…	—	B ✗

Explanation: Efficiency = output/input. Input = output/efficiency = 300/0.75 = 400 J.
Note: The 100 J "lost" is not destroyed — it becomes heat, sound, or deformation energy. Energy is always conserved.

114	A 1000 kg car at 20 m/s must stop in 50 m. What brak…	—	C ✗

Explanation: First: $v^2 = u^2 + 2as \rightarrow 0 = 400 + 100a \rightarrow a = -4$ m/s². Then: F = ma = 1000 × 4 = 4000 N.
Note: Crossover trap — you must apply kinematics before Newton's law. Students who jump straight to F = ma have no value for a.

115	A 5 kg block rests on a surface with coefficient of …	—	C ✗

Explanation: $f_{max} = \mu N = \mu mg = 0.4 \times 5 \times 10 = 20$ N. This is the maximum force before the block starts moving.
Note: Static friction is self-adjusting — if you push with 10 N, friction is exactly 10 N (not 20 N). The formula gives the maximum, not the actual value.

116	An object in uniform circular motion at constant spe…	—	B ✗

Explanation: Speed is constant but velocity (a vector) changes direction continuously — therefore acceleration exists. It points toward the centre (centripetal).
Note: "Centrifugal force" is a fictitious force in a rotating frame. In the ground frame, only centripetal force exists. No inward force = object moves in a straight line.

117	A satellite of mass m orbits Earth at radius r with …	—	B ✗

Explanation: $F_c = mv^2/r$. For an orbiting satellite, gravity provides this force: $GMm/r^2 = mv^2/r$.
Note: The satellite is in freefall — it is continually falling toward Earth but moving sideways fast enough to keep missing. There is no "centrifugal" counterbalance.

118	In simple harmonic motion (SHM), maximum kinetic ene…	—	C ✗

Explanation: At equilibrium, potential energy = 0 and all energy is kinetic → $v_{max} = \omega A$. At the endpoints, v = 0 and all energy is potential.
Note: Maximum acceleration occurs at maximum displacement (endpoints), NOT at equilibrium.

Acceleration and velocity are 90° out of phase in SHM.

119	The period of a simple pendulum depends on:	—	C ✗

Explanation: T = 2π√(L/g). Mass cancels out. Period increases if L increases or if g decreases (e.g., on the moon).
Note: For large angles, the approximation breaks down and T increases slightly with amplitude. JAMB assumes small-angle approximation unless stated.

120	Two sound sources of frequencies 256 Hz and 260 Hz a…	—	C ✗

Explanation: Beat frequency = $|f_1 - f_2| = |260 - 256| = 4$ Hz. This is perceived as 4 loudness pulses per second.
Note: 516 Hz is the sum of frequencies — that gives a note, not beats. Beats require two closely spaced frequencies, heard as periodic amplitude variation.

121	The speed of sound is greatest in which medium?	—	D ✗

Explanation: Sound speed increases with elasticity and decreases with density. Steel ≈ 5000 m/s; water ≈ 1500 m/s; air ≈ 340 m/s. Sound cannot travel in vacuum.
Note: Light travels FASTEST in vacuum and slows in denser media — the opposite pattern to sound. Students who confuse the two choose vacuum.

122	A sound wave has frequency 500 Hz and wavelength 0.6…	—	C ✗

Explanation: $v = f\lambda = 500 \times 0.68 = 340$ m/s. This is the speed of sound in air at approximately 15°C.

123	Total internal reflection occurs when light travels …	—	C ✗

Explanation: TIR occurs when the angle of incidence ≥ critical angle AND light travels from denser to less dense medium. $\sin(c) = n_2/n_1 = 1/1.5 \approx 41.8°$ for glass-air.
Note: TIR is impossible going from air to glass (rarer to denser). Light always refracts in that direction — never reflects entirely.

124	A convex lens (f = 20 cm) has an object at 30 cm. Us…	—	A ✗

Explanation: $1/f = 1/v - 1/u$. Taking u = −30 cm: $1/20 = 1/v + 1/30 \rightarrow 1/v = 1/20 - 1/30 = 1/60$. v = 60 cm (real image).
Note: Sign convention is the biggest source of error in optics. Choose one convention and apply it consistently throughout a single calculation.

125	A plane mirror always forms an image that is:	—	B ✗

Explanation: Plane mirror: image is virtual (behind mirror), erect (right-way up), same size (magnification = 1), same distance behind mirror as object is in front.
Note: The image is laterally inverted (left becomes right), but NOT vertically inverted. Students confuse lateral inversion with vertical flip.

126	Two point charges +3 μC and −3 μC are separated by 0…	—	A ✗

Explanation: $F = kq_1q_2/r^2 = (9\times10^9 \times 3\times10^{-6} \times 3\times10^{-6})/(0.03)^2 = 81\times10^{-3}/9\times10^{-4} = 90$ N.
Note: Opposite charges attract — the force is attractive, magnitude 90 N. The negative sign in the formula signals direction only; magnitude is still 90 N.

127	A 10 Ω resistor has 50 V across it. What current flo…	—	B ✗

Explanation: Ohm's law: I = V/R = 50/10 = 5 A.
Note: V = IR is Ohm's law only if resistance is constant (ohmic conductor). Non-ohmic devices (diodes, filament bulbs) change resistance with current.

128	Resistors of 2 Ω, 3 Ω, and 6 Ω are connected in para…	—	C ✗

Explanation: 1/R = 1/2 + 1/3 + 1/6 = 3/6 + 2/6 + 1/6 = 6/6 = 1. Therefore R = 1 Ω.
Note: Parallel resistance is ALWAYS less than the smallest individual resistor. If your answer is ≥ 2 Ω here, it is wrong. This is a reliable self-check.

129	A 4 Ω resistor carries a current of 3 A. Power dissi…	—	C ✗

Explanation: $P = I^2R = 3^2 \times 4 = 9 \times 4 = 36$ W. Equivalent forms: $P = IV = I^2R = V^2/R$.
Note: Choose the formula based on what you are given. Given I and R → use I^2R. Given V and R → use V^2/R. Given I and V → use IV.

130	A capacitor of capacitance C is charged to voltage V…	—	B ✗

Explanation: $E = \frac{1}{2}CV^2$. The ½ arises because voltage increases linearly from 0 to V as charge builds — the average voltage during charging is V/2.
Note: E = QV (without ½) overcounts — it assumes constant voltage V throughout charging, which is false. This is one of the most frequently misremembered formulas.

131	An EMF of 12 V is induced in a coil when flux change…	—	C ✗

Explanation: Faraday's law: $EMF = N \times \Delta\Phi/\Delta t \rightarrow N = EMF \times \Delta t/\Delta\Phi = 12 \times 0.05/0.6 = 10$ turns.
Note: EMF depends on the RATE of flux change ($\Delta\Phi/\Delta t$), not on flux magnitude alone. A constant flux induces zero EMF.

132	Lenz's law states that the direction of induced curr…	—	B ✗

Explanation: Lenz's law is a consequence of energy conservation. If induced current aided the flux change, we could get energy for free — which violates conservation of energy.
Note: This is why electric generators require mechanical work input — the induced current creates a magnetic force opposing the rotation (back-EMF).

133	A transformer has 100 primary turns and 500 secondar…	—	B ✗

Explanation: $V_s/V_p = N_s/N_p \rightarrow V_s = 240 \times 500/100 = 1200$ V. More secondary turns = step-up transformer.
Note: A step-up transformer increases voltage but decreases current by the same ratio (P = IV, power conserved). High voltage is NOT high power.

134	Radioactive decay rate is:	—	C ✗

Explanation: Radioactive decay is a nuclear process — completely unaffected by temperature, pressure, chemical environment, or electromagnetic fields.
Note: This is what fundamentally distinguishes nuclear reactions from chemical reactions. A chemistry student's instinct is to say "temperature increases rate" — correct for chemistry, wrong for radioactivity.

135	A radioactive sample has a half-life of 3 days. Afte…	—	C ✗

Explanation: 12 days ÷ 3 days = 4 half-lives. Remaining fraction = $(½)^4$ = 1/16.
Note: First compute number of half-lives (n = total time / t½), then raise ½ to that power. Students who just divide 1/2 by 12 get a nonsense answer.

136	Alpha (α) particles are:	C	C ✓
137	The pressure at depth h in a fluid of density ρ is:	C	C ✓
138	According to Archimedes' principle, the upthrust on …	—	C ✗

Explanation: Upthrust = ρ_fluid × V_submerged × g = weight of displaced fluid. Object floats when upthrust equals its weight (density ≤ density of fluid).
Note: A steel ship floats because its hull encloses air — its average density is less than water even though steel itself is denser. Volume matters, not just material.

139	The specific heat capacity of water is 4200 J kg^{-1} K…	—	B ✗

Explanation: Q = mcΔT = 2 × 4200 × 5 = 42 000 J.
Note: "Specific" in specific heat capacity means per kg. You must multiply by mass. Then multiply again by temperature change. Forgetting either multiplication is the typical error.

140	Which of the following is a LONGITUDINAL wave?	B	B ✓